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## NAMRU-Dayton Leading the Way in Unmanned Systems Human Factors Research

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A U.S. Navy RQ-2B Pioneer Unmanned Aerial Vehicle.

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In the late 1990s, the Naval Aerospace Medical Research Laboratory (NAMRL) in Pensacola, Fla. conducted early research on selection testing of RQ-2 Pioneer Unmanned Aircraft Systems (UAS) operators. After moving to Wright-Patterson Air Force Base,

Ohio last year as part of a Base Realignment and Closure (BRAC), the NAMRL team became the Aeromedical Directorate of the Naval Medical Research Unit – Dayton (NAMRU-Dayton).

The previous NAMRL research was successful in developing effective tests to select qualified Pioneer UAS operator candidates, but the significant changes that have occurred in UAS vehicles like interfaces and concepts of operations during the intervening decade, coupled with the retirement of Pioneer, suggest the tests used previously may no longer be relevant for selecting operators of the new advanced systems.

Last November NAMRU-Dayton hosted a tri-service workshop of UAS human factors research, development, test, and engineering. A range of critical research topics were identified over the course of the workshop. One of the major issues identified was the need for new research on UAS operator and crew selection.

NAMRU-Dayton researchers, in collaboration with researchers at the Naval Air Warfare Center (Aircraft and Training System Divisions), conducted a large-scale job-task analysis spanning multiple unmanned air vehicles and crew positions. The preliminary results suggest that operators of these newer systems need a very different skill set from their Pioneer predecessors.

Preliminary analyses suggest that UAS operator knowledge, skills, ability and other personal characteristics (KSAOs) related to communication, teamwork and decision making play the

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most significant roles in current UAS operations.

Across all platforms studied, the top-rated operator KSAOs include such traits as oral comprehension, oral expression, team-work skills, written comprehension, dependability, accountability, self-discipline, critical thinking and task prioritization.

In contrast to critical Pioneer KSAOS, physical and psychomotor skills were found to be relatively less important. For example hand-eye coordination, a skill critical for operation for the Pioneer vehicle ranked only 59th of 66 KSAOs rated in this recent study of advanced and highly automated unmanned systems.

*NAMRU-Dayton's mission is to maximize warfighter performance and survivability through world-class aeromedical and environmental health research by delivering solutions to the field and the Fleet. The Aeromedical Directorate conducts aerospace-relevant basic and applied research in the biomedical and behavioral sciences. Key areas of investigation include: spatial disorientation (SD), situational awareness, motion sickness, unusual acceleration environments, effects of altitude, sustained operations and fatigue, personnel selection, and visual and auditory sciences. Research efforts focus on the transition of products from the basic and applied research base to Navy Medicine, Naval Aviation, and other governmental and civilian customers. Recent and anticipated transitions include: validated aviation selection tests, novel training media to reduce SD mishaps, and new medications for motion sickness. The lab boasts a unique set of man-rated acceleration devices used by NAMRU-D researchers and international visiting scientists to maintain a technology base critical to Naval Aviation and other federal and non-federal aerospace customers.*

<http://www.med.navy.mil/sites/nmrc/Pages/namrud.htm>

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